

## ASSIGNMENT 4

Textbook Assignment: "Water Treatment and Purification" and "Sewage Treatment and Disposal." Pages 9-14 through 10-29.

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- 4-1. Physical impurities in water are divided into what two classifications?
1. Color and turbidity
  2. Suspended and dissolved
  3. Mineral and bacteria
  4. Silt and odor
- 4-2. Which of the following chemicals can be used to prevent the formation of algae in raw water supply points?
1. Chlorine
  2. Copper sulfate
  3. Activated carbon
  4. Each of the above
- 4-3. What term accurately describes a muddy or unclear condition of water caused by sand, clay, or organic matter?
1. Suspension
  2. Turbidity
  3. Backwashing
  4. Coagulation
- 4-4. To treat 1,000 gallons of water, you should use approximately how many ounces of activated carbon?
1. 1
  2. 10
  3. 100
  4. 1,000
- 4-5. When you are using copper sulfate to treat a lake, concentrations of organisms should never exceed how many parts per million to protect the lives of fish?
1. 1
  2. 2
  3. 3
  4. 5
- 4-6. You should reduce the water treatment rate when the outside temperature reaches what level?
1. 0°F
  2. 20°F
  3. 32°F
  4. 45°F
- 4-7. The total concentration of manganese in potable water should not exceed how many parts per million?
1. 0.1
  2. 0.3
  3. 0.5
  4. 0.7
- 4-8. The ion exchange unit removes which of the following undesirable properties of water?
1. Asbestos and chemicals
  2. Chemicals and radioactive particles
  3. Manganese and lead
  4. Hexavalent chromium and fluoride
- 4-9. Dissolved gases can be removed from a water supply by what means?
1. Aeration
  2. Chlorination
  3. Coagulation
  4. Ion exchange
- 4-10. You should NOT treat water with activated carbon that exceeds what maximum dosage?
1. 10 ppm
  2. 15 ppm
  3. 20 ppm
  4. 25 ppm
- 4-11. A water source with a pH value less than what number is an indication of possible CBR contamination?
1. 1.5
  2. 3.5
  3. 5.0
  4. 6.0

4-12. What water test kit does medical use to check a water source for chemical contamination?

1. M678
2. M474
3. M272
4. M222

4-13. The nuclear post-treatment cylinder used with the ROWPU removes which of the following agents?

1. Strontium
2. VX
3. BZ
4. All of the above

4-14. The rate of product water from the ROWPU is directly affected by the

1. turbidity of the water source
2. amount of contamination in the water source
3. operating pressure
4. temperature of the water source

4-15. What is the name of the process whereby latent heat is removed and steam becomes water?

1. Evaporation
2. Distillation
3. Vaporization
4. Condensation

4-16. The compressor in a thermal compression distillation unit raises the temperature of the steam from 212°F to what temperature?

1. 220°F
2. 222°F
3. 226°F
4. 229°F

4-17. Water produced by distillation equipment should NOT be used for what purpose?

1. Fire protection
2. Vehicle washing
3. Galley scrubbing
4. Personal cleanliness

4-18. To date, what type of filter is the most effective ever devised ?

1. Silica
2. Diatomite
3. Algae
4. Sand

4-19. You should use a slow sand filter under which of the following circumstances?

1. Coagulation is part of the process
2. High water output is desired
3. Low cost of operation is essential
4. Coagulation is not included in the process

4-20. The diatomite filter is classified as what type of filter?

1. Slow sand
2. Rapid sand
3. Pressure drop
4. Pressure

4-21. What type of treatment is used in residual disinfection as the final step in the water treatment process?

1. Coagulation
2. Chlorination
3. Activated carbon
4. Soda ash

4-22. What two extreme values retard disinfection?

1. High pH and low temperature
2. Low pH and high temperature
3. High pH and high temperature
4. Low pH and low temperature

4-23. What minimum amount of residual chlorine is considered significant?

1. 0.1 ppm
2. 0.2 ppm
3. 0.3 ppm
4. 0.4 ppm

4-24. What standard period of contact time is required for disinfection purposes to kill disease-producing organisms?

1. 10 minutes
2. 20 minutes
3. 30 minutes
4. 40 minutes

- 4-25. After using water sterilizing bags, you should add enough chlorine to the water so the residual chlorine after a total of 30 minutes has what minimum value?
1. 5 ppm
  2. 7 ppm
  3. 3 ppm
  4. 9 ppm
- 4-26. What is the minimum amount of time you must boil water to kill disease-producing bacteria?
1. 60 seconds
  2. 45 seconds
  3. 30 seconds
  4. 15 seconds
- 4-27. What term describes the process whereby more chlorine than needed for the chlorine residual essential to marginal chlorination is used?
1. Chlorination
  2. Superchlorination
  3. Dechlorination
  4. Dissipation
- 4-28. When decay proceeds under anaerobic conditions, what is the ultimate result?
1. Offensive odors
  2. Unsightly appearances
  3. Offensive conditions
  4. Each of the above
- 4-29. On a Navy installation that discharges liquid waste into controlled waters, you must maintain what standards?
1. Federal standards
  2. State standards only
  3. Local standards only
  4. State and local standards
- 4-30. Which of the following types of industrial waste should NOT be dumped into a regular sewage collection system?
1. Dry-cleaning fluids
  2. Radioactive isotopes
  3. Metal plating residues
  4. Flammable liquids
- 4-31. A heavy input of storm water into a sewage treatment plant results in what type of hydraulic problems?
1. Underloading
  2. Bypassing
  3. Overloading
  4. Diverting
- 4-32. Within a 24-hour period, the lowest flow in a sewage treatment system is between what hours?
1. 0000-0500 hours
  2. 0500-1000 hours
  3. 1000-1500 hours
  4. 1500-2000 hours
- 4-33. What is the normal color of wastewater containing dissolved oxygen?
1. Black
  2. Brown
  3. Gray
  4. Green
- 4-34. Domestic sewage should have what noticeable odor?
1. Moldy
  2. Sulphurous
  3. Grainy
  4. Musty
- 4-35. Wastewater is normally composed of what percentage of (a) water and (b) solids?
1. (a) 99.9 (b) 1.1
  2. (a) 99.9 (b) 0.1
  3. (a) 95.9 (b) 1.1
  4. (a) 95.9 (b) 0.1
- 4-36. What term is used to describe suspended solids that are not dissolved in wastewater?
1. Floatable solids
  2. Sludge
  3. Colloidal particles
  4. Sedimentation
- 4-37. Volatile solids either burn or evaporate within what temperature range?
1. 1500°C to 1600°C
  2. 1200°C to 1300°C
  3. 700°C to 800°C
  4. 500°C to 600°C

- 4-38. The acid or base properties of a water solution is measured in
1. mg/l
  2. ml/l
  3. pH
  4. DO
- 4-39. What term is used to describe wastewater that contains dissolved oxygen?
1. Anaerobic
  2. Aerobic
  3. Raw sewage
  4. Treated sewage
- 4-40. What term accurately describes the amount of oxygen used by bacteria and other wastewater organisms as they feed upon the organic solids in wastewater?
1. Oxygen nutrients
  2. Oxygen demand
  3. Oxygen supply
  4. Dissolved oxygen
- 4-41. What are the three biological organisms present in wastewater?
1. Bacteria, viruses, and pathogens
  2. Viruses, parasites, and pathogens
  3. Bacteria, parasites, and pathogens
  4. Viruses, bacteria, and parasites
- 4-42. What type of bacteria requires dissolved oxygen to remain alive?
1. Facultative
  2. Anaerobic
  3. Aerobic
  4. Parasitic
- 4-43. A grab sample normally covers what time span?
1. 15 minutes
  2. 30 minutes
  3. 45 minutes
  4. 60 minutes
- 4-44. A composite sample normally covers what time span?
1. 16 hours
  2. 2 hours
  3. 8 hours
  4. 4 hours
- 4-45. The flow proportional composite sample normally covers what time span?
1. 12 hours
  2. 24 hours
  3. 36 hours
  4. 48 hours
- 4-46. Which of the following tests should be performed at the time of sample selection?
1. Dissolved oxygen
  2. Sample temperature
  3. pH
  4. All of the above
- 4-47. For proper storage, you should maintain the sample within what temperature range?
1. -2°C to -10°C
  2. 2°C to 10°C
  3. 10°C to 18°C
  4. 18°C to 26°C
- 4-48. At sea level, pure water at 20°C can hold a maximum of how many milligrams per liter of dissolved oxygen?
1. 0.917
  2. 9.17
  3. 91.7
  4. 917.0
- 4-49. Treatment plant influent water should be between what pH values?
1. 6.5 to 8
  2. 2 to 4
  3. 8.5 to 10
  4. 4 to 6
- 4-50. An Imhoff cone should be used to perform which of the following tests?
1. Dissolved oxygen
  2. Activated sludge
  3. Settleable solids
  4. Hydrogen ion concentration
- 4-51. When performing the BOD<sub>5</sub> test, you should read one sample immediately and store the other at 20°C for exactly how many days?
1. 5
  2. 2
  3. 3
  4. 7

- 4-52. In which of the following tests should the sample be allowed to sit for 30 minutes?
1. Dissolved oxygen
  2. Activated sludge
  3. Settleable solids
  4. Hydrogen ion concentration
- 4-53. A COD test can be performed in a minimum of how many hours?
1. 1
  2. 2
  3. 3
  4. 4
- 4-54. Which of the following tests should be used as a control test to help you decide whether to increase or decrease the rate of sludge return?
1. pH
  2. MLSS
  3. BOD<sub>5</sub>
  4. COD
- 4-55. Which of the following tests should be performed within 30 minutes of taking a sample?
1. Total suspended solids
  2. Mixed liquor suspended solids
  3. Chlorine residual
  4. Fecal coliform
- 4-56. After a sample is chilled to 4°C, a fecal coliform test should be performed within how many hours?
1. 6
  2. 9
  3. 3
  4. 12
- 4-57. Laboratory records can be used for which of the following reasons?
1. To locate suitable plant operating controls
  2. To point out future plant requirements
  3. To protect the government from lawsuits
  4. Each of the above
- 4-58. Preventive maintenance should be scheduled so it can be performed at which of the following times?
1. During good weather only
  2. During peak loads only
  3. During good weather and low loads
  4. During bad weather and peak loads
- 4-59. For a wastewater plant that discharges effluent to a body of water, what type of permit must be obtained from the EPA or designated state agency?
1. NPDES
  2. Operating
  3. Discharge
  4. COD
- 4-60. What is the cheapest operating effluent discharge method?
1. Intermittent
  2. Continuous
  3. Direct discharge
  4. Indirect discharge
- 4-61. What type of effluent discharge requires a place to store the effluent?
1. Intermittent
  2. Continuous
  3. Direct discharge
  4. Indirect discharge
- 4-62. When effluent containing a toxic substance is accidentally discharged into receiving water used downstream as a drinking water supply for recreation or for livestock watering, the operator is required to notify which of the following constituents?
1. The regulating agency only
  2. The water users downstream only
  3. The regulating agency and the water users downstream
  4. The plant manager and the regulating agency
- 4-63. Recycled wastewater is seldom used for what type of water supply?
1. Industrial
  2. Recreational
  3. Irrigation
  4. Drinking

- 4-64. What type of soil has the best filtration and filtration characteristics?
1. Average loams only
  2. Sandy loams only
  3. Average and sandy loams
  4. Clay and top soil
- 4-65. When the weather is sunny, hot, and dry with strong breezes, what percentage of applied water can evaporate during the process of irrigation?
1. 15%
  2. 25%
  3. 50%
  4. 75%
- 4-66. Before being used on parks, golf courses, and other recreational areas, wastewater must be treated in which of the following ways?
1. Aerated
  2. Disinfected
  3. Clarified
  4. Polished
- 4-67. Vegetation around evaporation and percolation basins should not be allowed to exceed what maximum height?
1. 10 inches
  2. 15 inches
  3. 20 inches
  4. 24 inches
- 4-68. Trees should not be allowed to grow within how many feet of wastewater lagoons?
1. 150 feet
  2. 200 feet
  3. 450 feet
  4. 500 feet